PLAY & LEARN

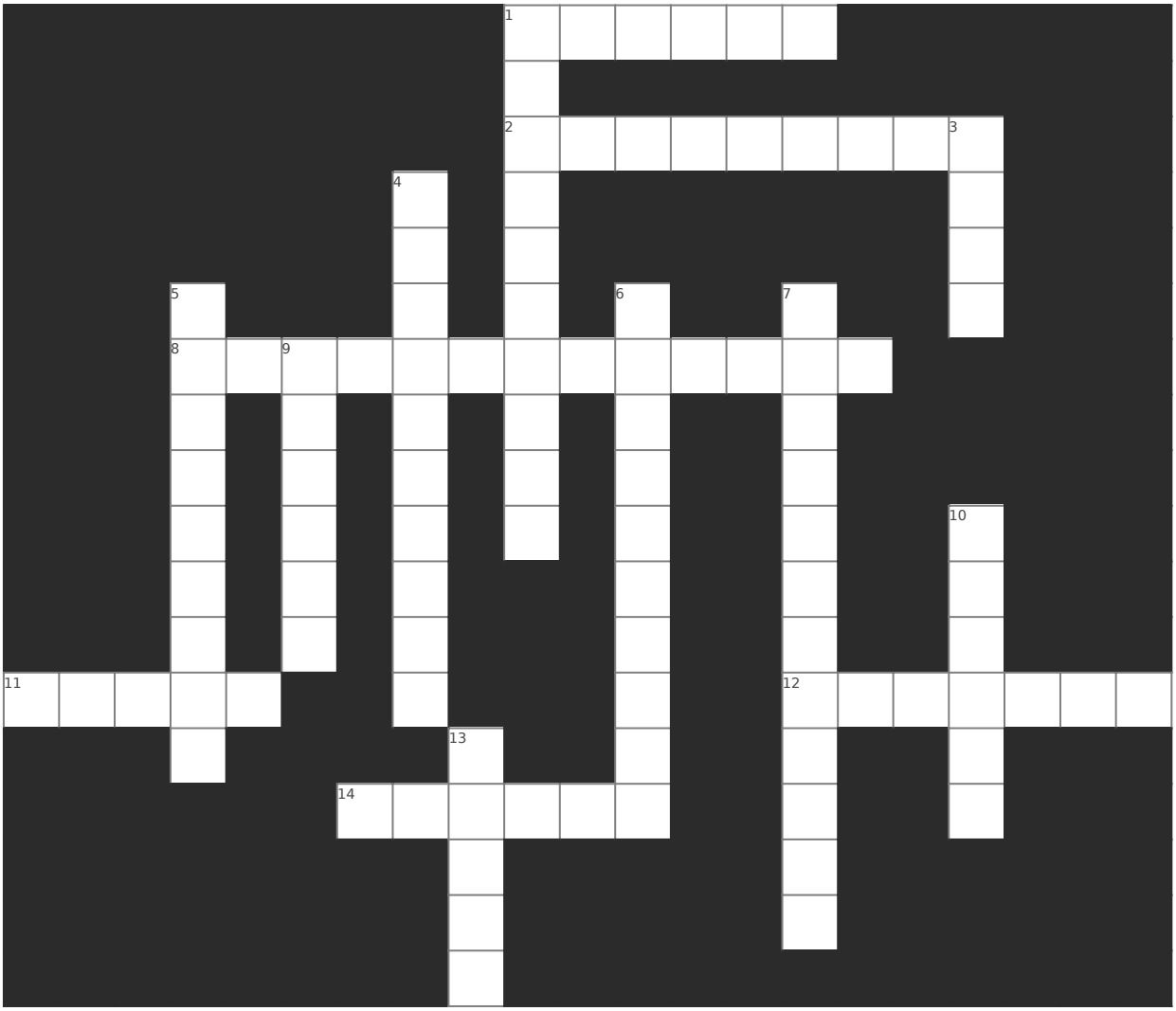
A puzzle workbook — crosswords, word searches, scrambles and quiz games

Print it. Solve it. Race a friend. Answer keys are at the back — no peeking.

#	Puzzle	Play it	Time
1	The Crossword	Solo or pairs	15 min
2	Word Search	Solo — race the clock	10 min
3	Scrambled Terms	Solo	8 min
4	Odd One Out	Teams of 4	10 min
5	Chapter Scrabble	Groups of 3–4	20 min
6	Who Am I? — Clue Cards	Whole class	15 min
7	True or False Sprint	Whole class, standing	6 min
8	Bingo	Whole class	15 min
9	Two Truths and a Lie	Pairs	10 min
10	The Escape Challenge	Teams of 4	25 min

Puzzle 1 · The Crossword

Every answer is a word from this chapter. Fill the white squares — one letter per square.



ACROSS

1. the quality that lets you tell two instruments apart (6)
2. the maximum displacement of a vibrating particle (9)
8. persistence of sound due to repeated reflection (13)
11. how high or low a sound is, related to frequency (5)
12. the unit of loudness (7)
14. the lowest point of a wave (6)

DOWN

1. ____ wave — vibration perpendicular to travel direction (10)
3. reflected sound heard after the original (4)
4. sound above the range of human hearing (10)
5. the number of vibrations per second (9)
6. the distance between two consecutive crests (10)
7. ____ wave — vibration parallel to travel direction; sound is one (12)
9. sound cannot travel through this (6)
10. the material through which sound travels (6)

13. a system using sound to detect underwater objects (5)

Puzzle 2 · Word Search

16 terms are hiding in the grid — across, down, diagonally, and backwards. Circle each one, then tick it off the list. Beat 10 minutes and you win.

I	G	G	I	Y	W	B	H	Q	M	H	H	U	R	V
M	W	H	G	X	E	C	P	N	E	T	I	A	G	A
X	R	G	V	A	T	D	H	R	G	F	N	G	B	C
F	V	U	K	I	H	X	B	N	F	O	C	J	N	U
R	Z	O	P	F	G	M	E	W	S	T	Q	X	K	U
E	E	R	D	N	I	L	R	E	W	M	M	S	K	M
Q	D	T	I	T	E	A	N	X	F	U	H	P	J	S
U	U	A	G	V	M	C	O	V	T	I	N	E	O	F
E	T	B	A	D	R	O	H	R	A	D	D	A	B	K
N	I	W	F	I	J	V	A	Y	I	E	S	K	T	K
C	L	J	D	E	C	I	B	E	L	M	L	E	O	C
Y	P	O	J	U	K	T	V	J	T	K	W	R	N	A
S	M	K	C	D	E	C	H	O	J	Y	R	E	E	X
T	A	B	L	A	B	F	M	N	A	T	S	I	U	Q
Q	K	V	I	U	L	T	R	A	S	O	N	I	C	Z

☐ WAVELENGTH	☐ ULTRASONIC	☐ AMPLITUDE
☐ FREQUENCY	☐ DECIBEL	☐ SPEAKER
☐ TIMBRE	☐ MEDIUM	☐ VACUUM
☐ TROUGH	☐ SONAR	☐ PITCH
☐ TABLA	☐ VOCAL	☐ ECHO
☐ TONE		

Race Rules

- **Solo:** find all the words. Note your time at the top of the page.
- **Pairs:** one partner finds across-and-down words, the other finds diagonals. First pair to complete the list wins.
- **Hard mode:** cover the word list. Find as many chapter terms as you can in 5 minutes.
- **Champion move:** for every word you find, say what it means out loud. No meaning, no point.

Puzzle 3 · Scrambled Terms

Every row is a chapter word with its letters shuffled. Unscramble it. The clue in brackets is your lifeline — try to solve without it first.

#	Scrambled letters	Clue	Your answer
1	E B R R R I T N V E O A E	(persistence of sound from repeated reflections)	_____
2	T I L L D N G N O A I U	(the type of wave sound is)	_____
3	I L S O C N R T A U	(sound frequency above human hearing range)	_____
4	U E D P L M T I A	(maximum displacement of a vibrating particle)	_____
5	U E F E Y Q C R N	(vibrations per second)	_____
6	I C O P N M R S S O E	(the crowded region of a longitudinal wave)	_____
7	O N R E A T C F R A I	(the spread-out region of a longitudinal wave)	_____
8	O S O P A Y G N R H	(medical imaging using ultrasonic sound)	_____

Make It a Game

Beat the Bell: the teacher sets a 60-second timer. Every unscrambled word inside the bell = 1 point; a word you can also *define* = 3 points.

Chain Scramble: in a circle, each student scrambles a chapter word for the person on their left. Miss it and you are out. Last student standing wins.

Puzzle 4 · Odd One Out

Three belong together. One does not. Circle the odd one — then write why in one line. The "why" is where the marks are.

#	Which is the odd one out?	Because…
1	Wavelength · Amplitude · Frequency · Fulcrum	_____
2	Solids · Liquids · Gases · Vacuum (sound travel)	_____
3	Echo · Reverberation · Sonar · Valency	_____
4	Crest · Trough · Compression · Rarefaction	_____
5	Tabla · Vocal cords · Speaker · Thermometer	_____
6	Pitch · Loudness · Timbre · Distance	_____

Puzzle 5 · Chapter Scrabble

Play in groups of 3–4. You have one shared rack of letter tiles. Build only terms from this chapter — no ordinary English words allowed.

Your tile rack — cut these out or write them on paper squares:

A 1	**B** 3	**C** 3	**D** 2	**E** 1	**G** 2	**H** 4
I 1	**L** 1	**M** 3	**N** 1	**O** 1	**P** 3	**R** 1
S 1	**T** 1	**U** 1	**V** 4	**X** 8	**Y** 4	**Z** 10

Scoring:

You did this	Points
Each letter tile used	Its tile value
Word is a term from this chapter	× 2
Word is 8 letters or longer	+ 10 bonus
You can state its meaning correctly	+ 5
You can connect it to a real-life example	+ 3
Word is *not* in this chapter (challenged and lost)	− 5

How a Round Works

1. Player builds a word from the rack and lays it down.
2. Any opponent may **challenge** within 10 seconds: "That's not in this chapter."
3. Open the textbook. If the challenger is right, the word is removed and the builder loses 5 points. If the challenger is wrong, the *challenger* loses 5 points.
4. Builder states the meaning to claim the +5 bonus. The group votes on whether it was correct.
5. Play 6 rounds. Highest total wins.

Target Words (worth the most — do not show your opponents)

REVERBERATION · LONGITUDINAL · ULTRASONIC · COMPRESSION · RAREFACTION · FREQUENCY · AMPLITUDE · SONOGRAPHY

Puzzle 6 · Who Am I? — Clue Cards

Cut along the lines. One student draws a card and reads only the first clue aloud; the class guesses. Wrong guess? Read clue 2. Fewer clues used = more points.

CARD 1 ① I am the distance between two consecutive crests. ② My symbol is the Greek letter lambda. ③ I am wavelength.	**CARD 2** ① I am the maximum displacement of a vibrating particle. ② I determine how loud a sound is. ③ I am amplitude.
CARD 3 ① I am the number of vibrations per second. ② My SI unit is the hertz. ③ I am frequency.	**CARD 4** ① I am reflected sound heard after the original. ② You hear me in an empty hall or a canyon. ③ I am an echo.
CARD 5 ① I let you tell a violin from a flute even at the same pitch and loudness. ② I am also called sound quality. ③ I am timbre.	**CARD 6** ① I am sound above the range of human hearing. ② Bats and dolphins use me to navigate. ③ I am ultrasonic sound.
CARD 7 ① I use sound to detect underwater objects. ② Submarines rely on me. ③ I am sonar.	**CARD 8** ① I am the material sound must travel through. ② I can be solid, liquid or gas. ③ I am the medium.
CARD 9 ① Sound cannot travel through me at all. ② Space is mostly made of me. ③ I am a vacuum.	**CARD 10** ① I am the persistence of sound from repeated reflections. ② Auditoriums are designed to reduce me. ③ I am reverberation.
CARD 11 ① I am the type of wave sound actually is. ② My vibrations move parallel to the wave's direction of travel. ③ I am a longitudinal wave.	

Scoring: guessed after clue ① = **5 points** · after ② = **3 points** · after ③ = **1 point**

Puzzle 7 · True or False Sprint

Everyone stands. Teacher reads a statement. True → stay standing. False → sit down. Get it wrong and you are out. Last student standing wins.

#	Statement	Your call
1	Sound can travel through a vacuum.	☐ True ☐ False
2	Sound is a longitudinal wave.	☐ True ☐ False
3	Amplitude determines the loudness of a sound.	☐ True ☐ False
4	Frequency determines the pitch of a sound.	☐ True ☐ False
5	An echo is reflected sound heard after the original.	☐ True ☐ False
6	Ultrasonic sound is below the range of human hearing.	☐ True ☐ False
7	Bats use ultrasonic sound to navigate.	☐ True ☐ False
8	Sonar is used to detect objects underwater.	☐ True ☐ False
9	Timbre lets you distinguish two instruments playing the same note.	☐ True ☐ False
10	Reverberation is the same thing as an echo.	☐ True ☐ False
11	Sound travels faster in solids than in air, generally.	☐ True ☐ False
12	A compression is a spread-out region of a sound wave.	☐ True ☐ False
13	A rarefaction is a spread-out, low-pressure region of a sound wave.	☐ True ☐ False
14	The SI unit of frequency is the decibel.	☐ True ☐ False

Puzzle 8 · Bingo

Each student fills the empty grid below with any 16 words from the word bank — in any order, one per box. The teacher then reads out meanings, not names. Cross a box only when its meaning is called. First to a full row, column or diagonal shouts BINGO.

Word bank — choose any 16:

Wavelength	Amplitude	Frequency	Echo
Timbre	Ultrasonic	Sonar	Medium
Vacuum	Reverberation	Longitudinal wave	Compression
Rarefaction	Pitch	Loudness	Decibel

Your bingo card:

> **Caller’s List (teacher only — read the meaning, never the name)**
>
> ① "I am the distance between two consecutive crests." ② "I am the maximum displacement of a vibrating particle." ③ "I am the number of vibrations per second." ④ "I am reflected sound heard after the original." ⑤ "I let you tell two instruments apart at the same pitch." ⑥ "I am sound above the range of human hearing." ⑦ "I use sound to detect underwater objects." ⑧ "I am the material sound must travel through." ⑨ "Sound cannot travel through me at all." ⑩ "I am the persistence of sound from repeated reflection." □ "I am the crowded, high-pressure region of a sound wave." □ "I am the spread-out, low-pressure region of a sound wave."

Puzzle 9 · Two Truths and a Lie

Each set has three statements. Two are true, one is a lie. Circle the lie — and correct it in one line.

Set 1

(a) Sound is a transverse wave.
(b) Sound is a longitudinal wave.
(c) Sound needs a medium to travel.

The lie is _____ . Corrected: _____

Set 2

(a) Amplitude affects loudness.
(b) Frequency affects pitch.
(c) Amplitude affects pitch.

The lie is _____ . Corrected: _____

Set 3

(a) Ultrasonic sound is above human hearing range.
(b) Bats use ultrasonic sound to navigate.
(c) Ultrasonic sound is below human hearing range.

The lie is _____ . Corrected: _____

Set 4

(a) Sound cannot travel through a vacuum.
(b) Sound travels through solids, liquids and gases.
(c) Sound travels fastest through a vacuum.

The lie is _____ . Corrected: _____

Puzzle 10 · The Escape Challenge

Solve all five gates. Each gives you one digit. Collect all five to unlock the exit code.

GATE 1 — The Wave Gate

Sound is a longitudinal wave. Count the letters in LONGITUDINAL.

Digit: ☐

GATE 2 — The Hearing Gate

How many characteristics of sound are named (pitch, loudness, timbre)? Use that number.

Digit: ☐

GATE 3 — The Medium Gate

How many media can sound travel through (solid, liquid, gas)? Use that number.

Digit: ☐

GATE 4 — The Echo Gate

Count the letters in ECHO.

Digit: ☐

GATE 5 — The Sonar Gate

Count the letters in SONAR.

Digit: ☐

EXIT CODE: ☐ ☐ ☐ ☐ ☐

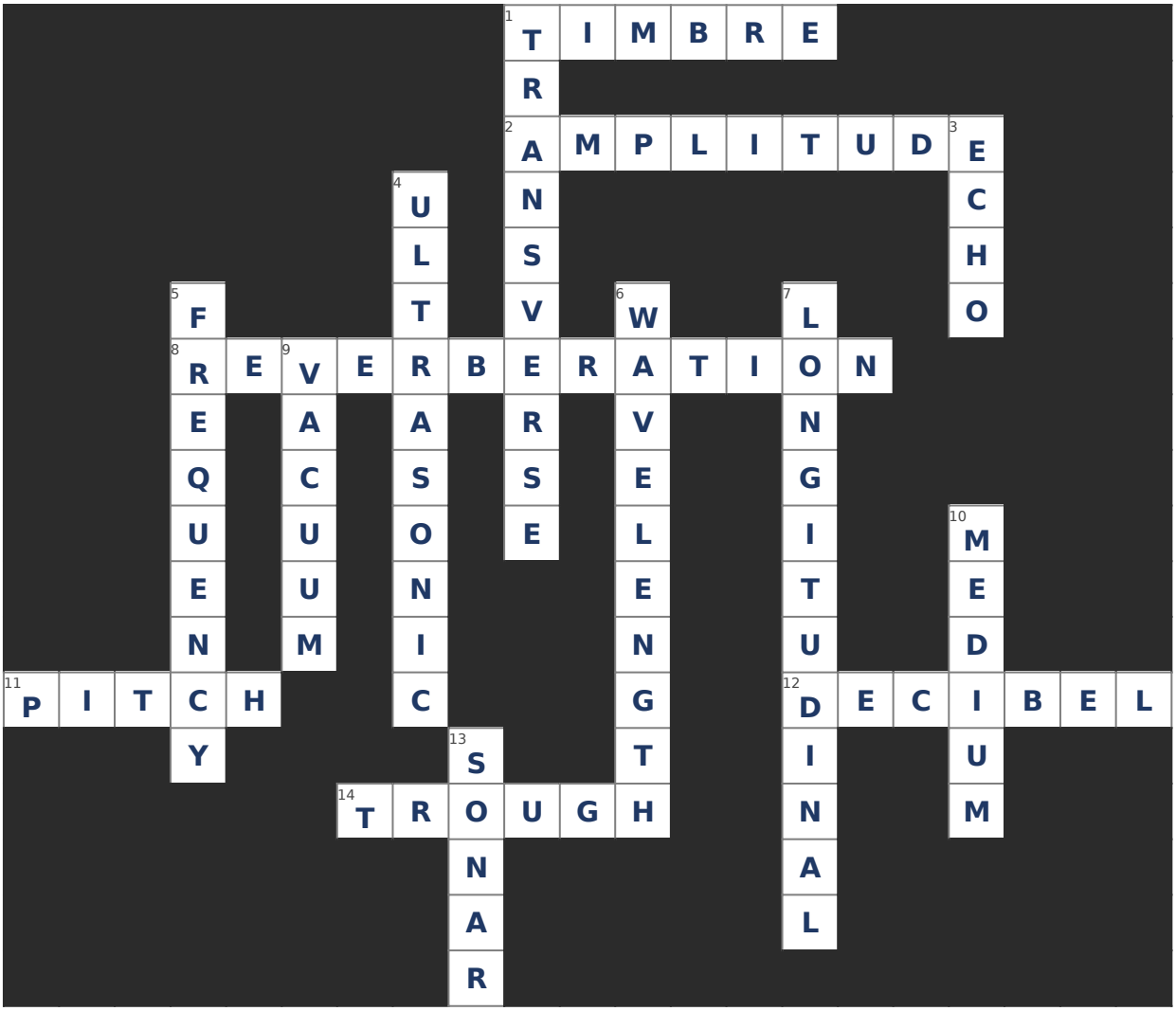
Teacher's note

Hide the gate cards around the classroom. Teams rotate every 4 minutes. First team to reach the door with the correct code escapes. Losing teams try again next period.

🔑 Answer Keys

Teachers and self-checkers only. Solve first — the puzzle is the point.

Puzzle 1 · Crossword — Solved Grid



Across: 1 TIMBRE · 2 AMPLITUDE · 8 REVERBERATION · 11 PITCH · 12 DECIBEL · 14 TROUGH

Down: 1 TRANSVERSE · 3 ECHO · 4 ULTRASONIC · 5 FREQUENCY · 6 WAVELENGTH · 7 LONGITUDINAL · 9 VACUUM · 10 MEDIUM · 13 SONAR

Puzzle 2 · Word Search — Solved Grid

I	G	G	I	Y	W	B	**H**	Q	M	H	**H**	U	**R**	**V**
M	W	**H**	G	X	E	**C**	P	N	**E**	**T**	I	**A**	G	**A**
X	R	**G**	V	A	**T**	D	H	**R**	**G**	F	**N**	G	B	**C**
F	V	**U**	K	**I**	H	X	**B**	**N**	F	**O**	C	J	N	**U**
R	Z	**O**	**P**	F	G	**M**	**E**	W	**S**	T	Q	X	K	**U**

E	E	R	D	N	I	L	R	E	W	M	M	S	K	M
Q	D	T	I	T	E	A	N	X	F	U	H	P	J	S
U	U	A	G	V	M	C	O	V	T	I	N	E	O	F
E	T	B	A	D	R	O	H	R	A	D	D	A	B	K
N	I	W	F	I	J	V	A	Y	I	E	S	K	T	K
C	L	J	D	E	C	I	B	E	L	M	L	E	O	C
Y	P	O	J	U	K	T	V	J	T	K	W	R	N	A
S	M	K	C	D	E	C	H	O	J	Y	R	E	E	X
T	A	B	L	A	B	F	M	N	A	T	S	I	U	Q
Q	K	V	I	U	L	T	R	A	S	O	N	I	C	Z

Puzzle 3 · Scrambled Terms

1. REVERBERATION · 2. LONGITUDINAL · 3. ULTRASONIC · 4. AMPLITUDE · 5. FREQUENCY · 6. COMPRESSION · 7. RAREFACTION · 8. SONOGRAPHY

Puzzle 4 · Odd One Out

#	Odd one	Because
1	Fulcrum	wavelength, amplitude and frequency are all wave properties; fulcrum belongs to Chapter 7
2	Vacuum	sound travels through solids, liquids and gases; it cannot travel through a vacuum
3	Valency	echo, reverberation and sonar are all sound phenomena; valency belongs to Chapter 9
4	Compression, Rarefaction	crest and trough describe transverse waves; compression and rarefaction describe longitudinal waves — pick whichever pair does not match the given wave type context
5	Thermometer	tabla, vocal cords and speaker are all sound sources; a thermometer measures temperature
6	Distance	pitch, loudness and timbre are the three characteristics of sound; distance is not one of them

Puzzle 7 · True or False Sprint

1-F · 2-T · 3-T · 4-T · 5-T · 6-F · 7-T · 8-T · 9-T · 10-F · 11-T · 12-F · 13-T · 14-F

Puzzle 9 · Two Truths and a Lie

Set	The lie	Correction
1	a	Sound is a longitudinal wave, not transverse — its vibrations are parallel to the direction of travel.
2	c	Amplitude affects loudness, not pitch — frequency is what determines pitch.
3	c	Ultrasonic means ABOVE the human hearing range, not below.
4	c	Sound cannot travel through a vacuum at all — there is no medium.

Puzzle 10 · The Escape Challenge

EXIT CODE: 1 · 3 · 3 · 4 · 5

(Answer: 12, take first digit → 1) (Answer: 3) (Answer: 3) (Answer: 4) (Answer: 5)

Now go clap in a large empty room and a small full one — can you hear the difference reverberation makes? □□